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REMARKS

The Applicants have carefully reviewed and considered the Office Action of October 9, 2001. In response the Applicants amend claim 1 to overcome the rejection of claims 1-7 under 35 USC § 112, first paragraph. Substantively the claim remains unchanged and the Examiner is requested to reconsider the patentability of this claim and claims 2-7 dependent thereon based upon the following patentability arguments. Since no new issues are raised, reconsideration by the Examiner at this time is appropriate.

Claim 8 is amended to clearly recite that the binder is selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof. Arguments supporting the patentability of this claim in this form have been previously considered by the Examiner and reconsideration of those arguments as restated herein is now respectfully requested.

As amended claim 1 reads upon an article comprising at least one surface covered by (a) a water-soluble superabsorbent polymer precursor, (b) optionally a viscosity modifying agent and (c) a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof. Clearly, such an article is disclosed and described in this patent application and support for this claim as now drafted is indisputably found throughout the text of the specification. Accordingly, the rejection of this claim as well as claims 2-7 dependent thereon under 35 USC § 112, second paragraph is now overcome and should be withdrawn.

Turning now to the substantive issues, independent claim 1 very clearly patentably distinguishes over the Kono et al. and Shiono et al. references. The

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Kono et al. reference discloses a cable including a water absorbing composition layer 2 formed on a substrate 1 from a water-absorbing resin 3 and a binder 4 blended with the resin. By explicitly teaching the blending of the binder with the resin, it is clear that curing takes place before application to the article. Thus, the Kono et al. reference very clearly does not teach an article having at least one surface covered by a water-soluble superabsorbent polymer precursor as set forth in claim 1. In fact, the Kono et al. reference explicitly teaches away from the presently claimed invention and, accordingly, rejection of claim 1 in view of the Kono et al. reference under 35 USC § 102 is clearly improper and must be withdrawn.

Further, it should be appreciated that the Kono et al. reference does not in any way provide a proper basis for the rejection of claim 1 under 35 USC § 103. Specifically, as noted in the present specification at page 5 line 9 to page 6 line 8, any coating applied to the article must be thick enough to provide good coverage and protection from water penetration but it also must include sufficient flow ability to provide a uniform coating on the surface of the article in one pass through the coating apparatus. Further, this must be done while preventing any clogging of the coating apparatus, die orifices or other machinery used to make polymer coated fibrous articles.

In order to meet these seemingly conflicting requirements, it is necessary to make some compromises when one seeks to coat with an already cured/resin containing coating such as disclosed in the Kono et al. reference. Specifically, the cross linking of the cured resin must be limited and/or the viscosity of the coating composition must be modified by adding dry

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not claim
particulate ingredients such as a flocculent polymer or starch. Any decrease in cross-linking reduces the gel strength of the coating. Further, the addition of dry particulate ingredients commonly results in a composition that is not homogeneous because the composition contains varying levels of the particulate material. This makes handling difficult and compromises the spreadability of the composition.

All these problems are avoided when one (a) applies the coating to the article with a water-soluble superabsorbent polymer precursor as set forth in claim 1 and (b) completes curing after the article is coated. The Kono et al. reference fails to even recognize or much less address the shortcomings noted above that are characteristic of coating with a cured resin material. As a consequence, the Kono et al. reference fails to teach or suggest how it is possible to overcome these shortcomings much less recognize that the article could be coated with a superabsorbent polymer precursor as set forth in present claim 1. Accordingly, Applicant submits that the Kono et al. reference provides no motivation for one skilled in the art to modify the explicit teachings of Kono et al. to correspond to the invention set forth in claim 1. As such the Kono et al. reference fails to support any rejection of that claim under 35 USC § 103.

This is also true of the Shiono et al. reference. The Shiono et al. reference relates to an optical fiber cable spirally wound with a water absorbing tape 9 formed by coating the surface of the tape substrate with the powder of a water absorbing polymer and particles of an inorganic antibacterial agent or sterilizing agent dispersed in a rubber based binder. Like the Kono et al.

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reference, the Shiono et al. reference explicitly teaches the provision of a water absorbing polymer in a binder and no mention of the use of a precursor is made. Accordingly, the Shiono et al. reference actually teaches away from the present invention; that is, the present invention explicitly claims an article having at least one surface covered by a water-soluble superabsorbent polymer precursor whereas the Shiono et al. reference explicitly teaches coating an article with a cured resin and not a precursor. Thus, Applicant submits that the rejection under 35 USC § 102 based upon the Shiono et al. reference is improper and should be withdrawn. Similarly, the Shiono et al. reference provides no motivation to lead one skilled in the art to treat an article with a precursor rather than cured resin and, accordingly, the Shiono et al. reference also fails to provide any basis for a rejection under 35 USC § 103.

Claims 2 and 3 rejected upon the same grounds, depend from claim 1 and, therefore, are equally allowable for the same reasons.

Independent claim 8 also very clearly patentably distinguishes over the Kono et al. and Shiono et al. references. Claim 8 reads upon a water resistant coating comprising a superabsorbent water-soluble polymer, wherein the superabsorbent polymer is obtained as an aqueous solution of a polymer precursor and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof and is cured to form a superabsorbent polymer. Applicant submits that, the Kono et al. and Shiono et al. references explicitly teach a coating composition comprising a binder and cured resin rather than a precursor. There is no teaching or suggestion whatsoever in the English abstract of the Kono et al. reference related in any way to the provision

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of a superabsorbent polymer obtained as an aqueous solution of a polymer precursor and a binder. This is also true of the Shiono et al. reference.

The Examiner acknowledges in the Office Action that the Kono et al. and Shiono et al. references do not expressly disclose coatings prepared from an aqueous solution as recited in claim 8 but then argues that the product is the same as the presently claimed product. Applicant submits that this argument is improper considering the unpredictability of chemical processes in general and polymerization processes in particular. There is no reason to believe that a cured resin and binder mixture will produce the same product as a mixture of a polymer precursor and binder that are cured together. Thus, upon reconsideration it is believed the Examiner should withdraw the rejection of claim 8 which patentably distinguishes over this art.

Applicants submit that claims 1-6 also patentably distinguish over the Manning et al. reference. The Manning et al. reference discloses a water absorbent fiber web having a hydrophilic polymer applied as a liquid and cross linked after application to the web. In this particular embodiment, no binder is present. In an alternative embodiment, the fibrous web is treated on one side with a latex bonding agent and on the other side with a polymer capable of cross linking or complexing to form an absorbent polymer. As previously pointed out, in neither instance does Manning teach or in any way show or suggest a provision of an article having at least one surface covered by a water resistant coating comprising a water-soluble superabsorbent polymer precursor and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof as explicitly set forth in claim 1.

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In one instance the Manning et al. reference teaches utilizing a hydrophilic polymer in the absence of binder on an article. In the other instance the Manning et al. reference teaches utilizing a hydrophilic polymer on one side of an article and a latex bonding agent on the other side of the article. In neither instance does the Manning et al. reference teach any form of composition or any article having a surface covered by a water-soluble superabsorbent polymer precursor, optionally a viscosity modifying agent and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof as set forth in claim 1. Applicant submits that the Manning et al. reference does not teach or suggest the claimed invention and there is no suggestion in the Manning reference to motivate one skilled in the art to modify the explicit teachings of that reference to conform to the invention as set forth in claim 1. Accordingly, the Manning et al. reference provides no basis whatsoever for the rejection of claim 1 or claims 2-6 dependent thereon.

Applicant submits that claims 1-6 and 8 patentably distinguish over the Kroesbergen reference. The Kroesbergen reference relates to a substrate with a super-absorbent material. The Kroesbergen reference explicitly teaches allowing suitable monomers to polymerize in the presence of a catalyst in order to obtain a polymer solution, adding a cross-linking agent to the polymer solution to obtain a pasty composition and then subsequently applying the composition to a substrate. The art cited by the Examiner explicitly teaches curing and cross linking the superabsorbent polymer prior to applying it to the substrate or article. Again, the Examiner has relied upon a reference that explicitly teaches curing the polymer prior to application to the article rather

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than applying a superabsorbent polymer precursor to the article as set forth and claimed in claim 1. The Examiner has relied upon a reference that explicitly teaches away from the present invention and provides no motivation whatsoever to modify the procedure explicitly taught in the reference and apply any polymer precursor to an article as claimed. In fact, the Examiner's citation to a line of prior art references that actually explicitly teach away from the present invention provides strong evidence of the unobviousness of the present invention. Thus, the cited art supports the patentability of the present claims.

Not only is this true of claims 1-6 but also independent claim 8. The Kroesbergen reference simply does not in any way teach or suggest a superabsorbent polymer obtained as an aqueous solution of a polymer precursor and a binder that is subsequently cured. Therefore, Applicants submit that claim 8 defines over this art and should be allowed.

Claims 9-15 which depend from claim 8 are equally allowable for the same reasons. As noted above, the Kono et al., Shiono et al. and Kroesbergen references all explicitly teach applying a cured resin to an article. They have nothing to do with a water resistant coating that is obtained as a product of an aqueous solution of a polymer precursor and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof as set forth in claim 8 from which claims 9 and 15 depend. As also noted above, the Manning et al. reference fails to suggest the mixing of a water-soluble polymer with any form of binder so there is no logical basis whatsoever for the rejection of claims 9-15 in view of this reference. Upon careful reconsideration it is believed the Examiner will agree and withdraw the rejection of claims 9-15

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which patentably distinguish from this art and should be formally allowed.

Claims 1-5 and 8-15 also very clearly patentably distinguish over the Gaa et al. and Cossement et al. references. As previously noted, at column 3 lines 20-27, it is a stated objective of Gaa et al. to provide non-woven, sheet-like mats having appropriate properties for use as base materials for roofing products such as shingles. The production of products with "superior rot resistance" is also noted (see column 1 line 61 and column 4 line 44). Obviously, rot resistance is increased by a product that sheds water and whether or not the Gaa et al. reference explicitly states that its product sheds water is immaterial. One of ordinary skill in the art would recognize that Gaa et al. is not teaching the production of a shingle product with superabsorbent capacity as such a product would lead directly to overloading of the roof structure from weight of absorbed water and most likely result in catastrophic collapse of the roof. Applicants submit that the Gaa et al. reference relates to a water shedding product.

Further, this view is supported by the chemistry disclosed in the Gaa et al. patent. Specifically, polyacrylics, polyacrylamides and/or polyamides are reacted with urea formaldehydes and/or silanes as specifically described at column 7 line 58 to column 8 line 42. This reaction forms a tightly bonded network that cannot possibly be superabsorbent. As such, the reaction explicitly described and taught in the Gaa et al. patent is the antithesis of the presently claimed invention and provides no reasonable or logical basis for the rejection of the present claims.

As noted in response to the last Office Action, for a product to be

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superabsorbent it must have the ionic bonding structure of a salt. These ionic bonds are broken preferentially for the water molecule. Thus the polymer "unzips" making room for the absorbence of even more water. The Gaa et al. patent teaches nothing of the forming of a salt or ionic bonding or any other type of easily broken bond that could lead to superabsorbency. Applicant submits that the Gaa et al. reference is not pertinent to the patentability of the present invention. Accordingly, Applicant submits that the rejection of claims 1-5 and 8-15 based upon the Gaa et al. patent is improper and requests that the rejection be withdrawn.

The Cossement et al. reference relates to a sizing composition for coating reinforcing polyamide resins. There is no suggestion whatsoever in the Cossement reference to indicate that the composition may be used in any end-use application as a coating that is exposed to an external environment much less in an application as set forth in the claims where water is absorbed as a means of protecting the coated surface from water permeation.

The coating composition in the Cossement et al. patent protects fibers during processing including chopping. The composition is not used in any way or is it suggested in any way to be useful in protecting fibers against water permeation. In fact, the composition disclosed in the Cossement et al. reference includes organo-silane coupling agents. As noted above with respect to the Gaa et al. reference, these agents actually promote the formation of a material from the polyacrylic acid that is not superabsorbent and, accordingly, it should be appreciated that the Cossement et al. reference forms no basis for rejecting the present claims. In reacting with an organo-silane coupling agent, a tightly

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bonded network is produced. Such a network is incapable of unzipping to make room for the absorbence of water. Accordingly, like the Gaa et al. reference, the Cossement et al. reference very clearly teaches away from the present invention and in no way forms any logical basis for the rejection of claims 1-5 and 8-15. It simply must be appreciated that the sizing composition art is unrelated, the disclosed composition includes an organo-silane coupling agent and is not superabsorbent, and as such one skilled in the art would not find the Cossement et al. reference relevant to the present invention.

In his comments in the latest Office Action the Examiner argues that "one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references". In combining the Gaa et al. and Cossement et al. references, the Examiner is combining two references that chemically cannot provide any superabsorbency. In fact, in the case of Gaa et al., superabsorbency in the proposed roofing product would lead to a product that promotes catastrophic roof failure through the weight of absorbed water. Applicant submits that these references could not be combined to form any type of superabsorbent product much less the product claimed. Upon reconsideration it is believed the Examiner will agree that there is no basis for the rejection of claims 1-5 and 8-15 in view of a combination of the Gaa et al. and Cossement et al. references.

Finally, claims 1-15 clearly patentably distinguish over the Arroyo et al. and Geursen et al. references when considered in combination with the Barch et al. reference. The Arroyo et al. and Geursen et al. references both fail to teach or suggest the use of a viscosity modifying agent or a film forming binder

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selected from a group consisting of polyesters, polyurethanes, epoxies, latex and mixtures thereof as set forth in claim 1.

At column 5 lines 60-68 and column 6 lines 1-4 and 43-49, the Arroyo et al. patent states that cross-linking density and water absorbency are the two competing factors necessary for superabsorbent coating. The Arroyo et al. reference provides no suggestion that a film forming binder or even a viscosity modifying agent would improve these properties and thus it provides no teaching to add these ingredients for these or any other reason. As such, the Arroyo et al. reference does not provide any teaching or suggestion to make the combination proposed by the Examiner.

The Barch reference does not relate to superabsorbent polymer coating technology. The Barch reference explicitly relates to an applicator such as a pad or roller for applying coatings of varying viscosities to substrates in order to achieve a more uniform finish of the coating on the substrate. At column 6 lines 18-20 Barch does teach utilizing film forming polymers in chemical treating compositions for such applicators but this teaching has nothing to do with superabsorbent polymer materials nor does it predict what would happen if superabsorbent polymer materials were modified to incorporate a binder. Further, the Barch et al. reference provides no suggestion to lead one skilled in the art of superabsorbent polymer compositions to add any binder. In fact, it is unclear why the Examiner feels one skilled in the art of superabsorbent polymer compositions would even consider reviewing any nonanalogous art relating to pad or roller applicators much less the Barch et al. patent.

Summarizing, the primary reference to Arroyo et al. does not suggest

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incorporating any type of film forming binder or even a viscosity modifying agent with a superabsorbent water-soluble polymer. The secondary reference to Barch et al. relates to a pad or roller coating applicator, an unrelated art field. The Barch et al. reference fails to teach, suggest or motivate one skilled in the art to modify a superabsorbent coating to include such a binder. Applicant submits that the Examiner has used Applicants' disclosure of the present invention in order to combine certain aspects of each reference to achieve the present invention. Applicants therefor request that the rejection of independent claims 1 and 8 as well as claims 2-7 and 9-15 dependent thereon be withdrawn.

Applicants submit that the Guersen et al. reference does not suggest the use of a film forming binder or a viscosity modifying agent with any water soluble superabsorbent polymer. The Guersen et al. reference teaches the coating of an aramid yarn in a water-and-oil emulsion containing a superabsorbent material. It in no way suggests use in applications where water exposure contact is likely, and as such the properties necessary for an aramid yarn are necessarily different than the applications where the present invention may be used. Further, in the context of the Geursen et al. reference, the addition of a viscosity modifying agent or a film forming binder could adversely affect the hydrophile-lipophile balance of the water-in-emulsion, and as such these ingredients may in fact be undesirable.

As noted above, the secondary reference to Barch et al. is unrelated to superabsorbent materials. As such it provides no motivation to modify the Geursen et al. reference. Just because you might add a binder to a pad or roller coating applicator material does not in any way suggest that you would add a

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binder to an aramid yarn coating as taught in the Geursen et al. reference. There simply is nothing in either the primary reference to Geursen et al. or the secondary reference to Barch et al. to teach, suggest or motivate one skilled in the art of water resistant coatings to coat an article with at least one surface covered by a water-soluble superabsorbent polymer precursor, optionally a viscosity modifying agent and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof as set forth in claim 1. Similarly, there is nothing in either of these references to lead one skilled in the art to provide a superabsorbent water-soluble polymer wherein the superabsorbent polymer is obtained as an aqueous solution of a polymer precursor and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof that is then cured to form a superabsorbent polymer as set forth in claim 8. Applicant submits that there is no motivation for the combination found in the references themselves. Therefore, Applicant requests that the rejection under 35 USC § 103 and claims 1 and 8 as well as claims 6-7 and 9-15 dependent thereon be withdrawn and that the claims be allowed.

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In summary, the pending claims clearly patentably distinguish over the prior art. Accordingly, the early issuance of a formal Notice of Allowance is earnestly solicited. If any fees are required pertaining to this response, the Applicants request that they be charged to Deposit Account number 50-0568.

Respectfully submitted,

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Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application

Applicant: Martin C. Flautt et al.

Serial No.: 09/409,457

Filed: September 30, 1999

For: SUPERABSORBENT WATER-
RESISTANT COATINGS**VERSION WITH MARKINGS TO SHOW CHANGES MADE****In the Claims**

1. (Twice Amended) An article [having at least one surface covered by a water-resistant coating] comprising:
at least one surface covered by:
 - (a) a water-soluble superabsorbent polymer precursor;
 - (b) optionally a viscosity modifying agent; and
 - (c) a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof.
8. (Twice Amended) A water-resistant coating comprising a superabsorbent water-soluble polymer, wherein the superabsorbent polymer is obtained as an aqueous solution of a polymer precursor and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof and is cured to form a superabsorbent polymer.